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DIGIPH PCS

November 8, 2000

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Ms. Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

RE: Digiph PCS's Location Technology for E911, Phase II,
CC Docket No. 94-102

Dear Ms. Salas:

On September 8, 2000, the Commission released a Fourth Memorandum Opinion and Order (FCC 00-326) in its E-911 rulemaking proceeding, CC Docket No. 94-102. This order granted VoiceStream Wireless Corporation ("VoiceStream") a waiver of the Commission's E-911 rules, 47 C.F.R. 20.18 *et. seq.*, in order to allow it to pursue a hybrid automatic location information (ALI) approach.

On May 30, 2000, Digiph PCS, Inc. ("DIGIPH") agreed to be purchased by PowerTel, Inc ("PowerTel"). Following, on August 27, 2000, PowerTel agreed to be purchased by VoiceStream. With the acquisition by PowerTel and then VoiceStream, DIGIPH's PCS network shall become part of the VoiceStream PCS network. DIGIPH, PowerTel, and VoiceStream shall use the same technological enhancements throughout the merged network. Therefore, DIGIPH shall pursue the same hybrid automatic location information (ALI) approach as it location technology for E911, Phase II.

VoiceStream's waiver was made subject to compliance with a number of conditions. In particular, VoiceStream is required to report to the Wireless Telecommunications Bureau semi-annually, beginning October 1, 2000, on "its experience with NSS and E-OTD, including actual deployment and the results of all tests and trials." Therefore, DIGIPH submits by reference the semi-annual report that VoiceStream filed in CC Docket No. 94-102 on October 2, 2000, as DIGIPH's submission of its location technology for E911, Phase II.

Sincerely,

Dwain A. Kinard
Vice President - Operations

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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

In the Matter of	)	
	)	
Revision of the Commission's Rules	)	CC Docket No. 94-102
To Ensure Compatibility with	)	
Enhanced 911 Emergency Calling Systems	)	

To: Wireless Telecommunications Bureau

SEMI-ANNUAL REPORT

VoiceStream Wireless Corporation

Brian Thomas O'Connor, Vice President,
Legislative and Regulatory Affairs

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1300 Pennsylvania Avenue, N.W.
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October 2, 2000

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

In the Matter of	)	
	)	
Revision of the Commission's Rules	)	CC Docket No. 94-102
To Ensure Compatibility with	)	
Enhanced 911 Emergency Calling Systems	)	

To: Wireless Telecommunications Bureau

SEMI-ANNUAL REPORT

On September 8, 2000, the Commission released a Fourth Memorandum Opinion and Order (FCC 00-326) in its E-911 rulemaking proceeding, CC Docket No. 94-102. This order granted VoiceStream Wireless Corporation (Voicestream) a waiver of the Commission's E-911 rules, 47 C.F.R. 20.18 *et. seq.*, in order to allow it to pursue a hybrid automatic location information (ALI) approach. This approach consists of implementing two elements: (1) a Network Software Solution (NSS) that would provide better than Phase I accuracy for all 911 calls on the VoiceStream network and (2) a location technology known as Enhanced Observed Time Difference of Arrival (E-OTD) that would over time meet the Commission's location accuracy requirements.

VoiceStream's waiver was made subject to compliance with a number of conditions. In particular, VoiceStream is required to report to the Wireless Telecommunications Bureau semi-annually, beginning October 1, 2000, on "its experience with NSS and E-OTD, including actual deployment and the results of all tests and trials." The information contained in this report is intended to meet this requirement.

This Report is divided into two basic sections. The first section covers VoiceStream's current efforts to develop and deploy NSS for positioning handsets. The second section covers VoiceStream's preparations to implement E-OTD, including up-to-date information on its negotiations with handset and infrastructure vendors, a more comprehensive report on Stage One of its E-OTD technology trial, and plans for its upcoming Stage Two of that trial. On a concluding note, the report will summarize VoiceStream's participation in the Location Interoperability Forum (LIF), an effort that was announced September 26, 2000. Spearheaded by Nokia, Motorola and Ericsson, the LIF is dedicated to developing global interoperability between mobile positioning systems.

I. NETWORK SOFTWARE SOLUTION (NSS)

VoiceStream is actively working with its equipment vendors to develop and deploy NSS. The key aspects of this technology are that it:

- uses signal strength data currently collected by the handset and/or timing advance information collected by the base station to improve the accuracy of the position estimate.
- impacts only on network elements, allowing any mobile making a 911 call on the network to be located – including non-ALI capable handsets and roamers.
- will provide increased accuracy over Phase I alone (cell ID) – 1000 meters, 67 percent of calls.
- can generate an improved accuracy result (over Phase I) even if the mobile can hear only one cell site. Accuracy improves if additional cell sites can be heard.
- will be deployed sooner than E-OTD or Assisted GPS (A-GPS) technologies can be deployed for GSM customers in the U.S. (by December 31, 2001).
- can continue to be used as a fallback location method for non-ALI capable handsets even after more accurate handset-based location technologies (such as E-OTD or A-GPS) have been deployed.

VoiceStream remains on track to develop and deploy the NSS throughout its network by the FCC implementation date of December 31, 2001. VoiceStream is currently working with its equipment vendors to sort out multi-vendor equipment interoperability issues related to the advanced algorithms of NSS. The solution is based on the GSM R99 LCS standards, using the cell ID + timing advance method. Some vendors are also incorporating signal strength measurements to increase the accuracy of the method.

II. E-OTD

A) Infrastructure

Since release of the Commission's order granting its waiver, VoiceStream has been negotiating with its infrastructure vendors in order to assure that the company will have
E-OTD-capable network equipment in a timely manner. All of VoiceStream's infrastructure vendors have confirmed that they will have products available incorporating an E-OTD location solution by the Third Quarter, 2001. VoiceStream is anticipating 90 days to install and commission E-OTD equipment, dependent upon the size of the system.

B) Handsets

Similarly, since release of the Commission's order granting its waiver, VoiceStream has been actively negotiating with its handset vendors so that it can comply with the handset deployment goals incorporated as a condition of the waiver (50 percent

of new handset activations with E-OTD capability by October 1, 2001; 100 percent of new handset activations with E-OTD capability by March 31, 2002). While those negotiations are currently proceeding and no contractual commitments have been made, VoiceStream does believe that these negotiations will conclude in a manner that will allow it to meet the Commission's handset deployment goals. In particular, one vendor has indicated that it currently believes that it can provision a low-end, high volume handset and a high-end handset to VoiceStream, both with E-OTD capability, by July 1, 2001. Further, another vendor has indicated that it will have E-OTD technology in certain handsets that will be available in the fourth quarter of 2001. All future handsets from this vendor launched after the first E-OTD product will be E-OTD compliant.

C) Technology Trials

As the Commission is aware, VoiceStream has been participating in an ongoing E-OTD technology trial, along with Cambridge Positioning Systems, Ltd. (CPS) in Houston, TX. On August 9, 2000, VoiceStream reported preliminary results of Stage One of the trial to the FCC, based on data taken from five hundred individual measurements inside and outside a stationary vehicle across an area of approximately 22.5 square kilometers (km^2). At that point, VoiceStream reported that these preliminary results compared very favorably with the FCC's handset accuracy requirements (50 meters for 67 percent of calls; 150 meters for 95 percent of calls). On August 11, 2000, Stage One of the trial was completed, with over 1000 individual measurements taken under these testing conditions at 26 fixed points. The final results continue to compare very favorably with the FCC's accuracy requirements: 67 percent of the measurements taken were within 57 meters of the actual position (determined via differential GPS), 92 percent were within 100 meters, and 97.5 percent were within 150 meters. There was little difference between measurements made inside and outside vehicles. As a preliminary matter, therefore, it appears that E-OTD performs well in suburban Houston, an area representative of a substantial majority of VoiceStream's 911 calls, and can approach the FCC's E-911 accuracy requirements. VoiceStream is attaching to this report a short presentation summarizing the final results of Stage One of the Houston trial. See Attachment.

Stage Two of the trial is scheduled to be conducted on October 9 and 10, 2000, during which time operators and trial participants will be able to make measurements. The objectives of Stage Two are:

- ***Increase the size of the testing area:*** The total commissioned test region is approximately 325 km^2 of suburban housing and shopping malls containing about 20 BTS sites each with an Location Measurement Unit (LMU) installed. The measurement area for Stage Two will be increased from 22.5 km^2 (the area covered by Stage One) to about 100 km^2. This increases the variety and type of measurement locations but still avoids the problem of edge effects where LMU/BTS coverage is sparse.

- ***Test in dedicated mode:*** Stage One testing was conducted using handsets that collected their E-OTD data during idle mode. Dedicated-mode software that will allow the collection of stationary measurements from voice calls is expected to be ready for testing in Houston at the beginning of October. Moving dedicated mode handset software is expected to be available later in the month.

- ***Test in a moving vehicle:*** CPS has developed an interim handset solution for moving tests implemented on an idle-mode platform. It is clearly an interim solution since a moving handset used for a 911 emergency call will need the combination of dedicated mode and moving software, which as indicated above will not be available in time for Stage Two.

- ***In-building testing:*** Testing during Stage One focused on the accuracy at set external points whose position was known and pre-calculated. Tests in Stage Two will allow in-building measurements to be carried out.

- ***OET 71 testing:*** Stage One of the trial was conducted in a suburban Houston, an area substantially representative of VoiceStream's 911 call patterns, consistent with the guidelines published in OET Document 71. VoiceStream will continue to adhere to OET's guidelines as closely as possible during the run-up to Stage Two, in order to provide as realistic a view as possible of the current state of E-OTD in the Houston network to the participants and to the FCC. Further, VoiceStream will conduct additional FCC compliance testing during the period from October 11 to October 18.

Beyond Houston, VoiceStream intends to focus testing on the commercial implementation of E-OTD. This will focus on using infrastructure vendors' equipment and not development LMUs, the main advantage being the support of in-band signaling (dedicated signaling channels). Testing will focus on a wider variety of areas including urban and rural environments. This testing is envisioned to take place in the first quarter of 2001 -- the earliest time frame for the availability of commercial LMUs and development handsets supporting dedicated signaling. Phase II trial results and OET 71 type testing are scheduled to be available by VoiceStream's next submission date (November 9, 2000)

III. CONCLUSION

In conclusion, VoiceStream would like to note that, on September 26, 2000, Nokia, Motorola and Ericsson announced the formation of the Location Interoperability Forum (LIF). [1] The LIF is an industry effort dedicated to developing global interoperability between mobile positioning systems. Many of the issues VoiceStream is

[1] See *Major wireless manufacturers unite to advance development of global location-based services and applications*, http://press.nokia.com/PM/791335.html

currently addressing with its network and handset vendors are the main initiatives of the LIF[2].

VoiceStream was invited to LIF prior to public announcement to provide input and guidance for the direction and initiatives the LIF will take, and will play an active role in the LIF's Market Advisory Group. VoiceStream's strategy with regard to E911 Phase II very closely resembles the views of the LIF founding members – namely, support for legacy handsets through the NSS; E-OTD technology as VoiceStream's main E911 Phase II locating technology; and Assisted GPS handsets, when available, for advanced commercial services and E911 Phase II. VoiceStream believes that the formation of the LIF is a significant step towards meeting the E911 Phase II requirements for the GSM community, and it is prepared to take steps necessary to achieve its objectives.

VoiceStream hopes that this report helps the Commission verify that NSS and E-OTD are progressing and remain realistic options at the present time for meeting the requirements of the VoiceStream waiver. As always, we remain available to answer questions and provide further information.

VoiceStream Wireless Corporation

By: _____

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October 2, 2000

[2] For more information see the LIF Website: www.locationforum.org